AMENDMENTS TO THE CLAIMS

The following is a complete, marked up listing of revised claims with a status identifier in parentheses, underlined text indicating insertions, and strikethrough and/or double brackets indicating deletions.

Listing of the Claims

1. (Currently Amended) A transmitter, comprising:

an upconverter for converting a first frequency signal to a second frequency signal, the second frequency signal including in-phase components and quadrature phase components;

a compensator including a plurality of filter units for compensating at least one of gain distortion and phase distortion introduced into the second frequency signal by at least the upconverter, the plurality of filter units including a first set of filter units configured to filter the in-phase components and quadrature phase components, output of the first set of filter units producing at least one of a gain compensated in-phase signal and a phase compensated in-phase signal, and a second set of filter units configured to filter the in-phase components quadrature phase components, output of second set of filter units producing at least one of a gain compensated quadrature-phase signal and a phase compensated quadrature-phase signal;

a compensator constructor, based on a channel model of at least the upconverter that includes an in-phase channel, a quadrature phase channel

and cross coupling channels between the in-phase and quadrature phase channels, estimating the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase components, and [[constructing]] configuring filters taps for [[each of the outputs of]] the first and second set of filter units; and

a predistorter to predistort the first frequency signal.

2. (Original) The transmitter of claim 1, wherein

the upconverter is a direct upconverter for directly upconverting a baseband signal to an RF signal; and

the compensator compensates for at least one of gain imbalance and phase imbalance introduced into the baseband signal by at least the direct upconverter.

3. Cancelled

4. (Previously Presented) The transmitter of claim 2, wherein the compensator compensates for dc offset introduced into the baseband signal by at least the direct upconverter.

5. Cancelled

6. Cancelled

7. (Previously Presented) The transmitter of claim 2, wherein the compensator constructor derives the filters as an inverse of the channel model for the direct upconverter based on the estimates and a cost function, which represents a mean squared error, in the frequency domain, between a desired response of a system including at least the direct upconverter and an actual response of the system including at least the filters and the direct upconverter.

8. (Previously Presented) The transmitter of claim 2, wherein the compensator constructor estimates each of the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase channels based on output from the compensator and a baseband signal derived from output of the direct upconverter.

9. (Previously Presented) The transmitter of claim 8, further comprising:

a feedback path including a down converter down converting output of the direct_upconverter; and wherein

the compensator constructor receives a signal on the feedback path.

10. (Original) The transmitter of claim 8, further comprising:

a power amplifier amplifying the RF signal for transmission;

a feedback path including a down converter down converting output of the power amplifier; and wherein

the compensator constructor receives a signal on the feedback path.

11. Cancelled

12. Cancelled

13. (Previously Presented) The transmitter of claim 1, wherein the compensator compensates for dc offset introduced into a lower frequency signal by at least the upconverter.

14. (Currently Amended) A transmitter, comprising:

a direct upconverter for converting a baseband signal directly to an RF signal, the baseband signal including in-phase and quadrature phase components;

a compensator including

a first filter for filtering the in-phase component to compensate for at least one of gain imbalance and phase imbalance in the in-phase component,

a second filter for filtering the quadrature phase component to compensate for at least one of gain imbalance and phase imbalance in the in-phase component associated with cross-coupling of the quadrature phase component with the in-phase component,

a third filter for filtering the quadrature phase component to compensate for at least one of gain imbalance and phase imbalance in the quadrature phase component, and

a fourth filter for filtering the in-phase component to compensate for at least one of gain imbalance and phase imbalance in the quadrature component associated with cross-coupling of the in-phase component with the quadrature component;

a compensator constructor, based on a channel model of at least the upconverter that includes an in-phase channel, a quadrature phase channel and cross coupling channels between the in-phase and quadrature phase channels, estimating the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase components, and [[constructing]] <u>configuring</u> filter taps for [[each of the outputs of]] the first and second set of filter units; and

a predistorter to predistort the first <u>frequency</u> signal.

15. (Original) The transmitter of claim 14, further comprising:

a first adder adding output of the first and second filters;

a second adder adding output of the third and fourth filters; and wherein the direct upconverter receives output from the first and second adders.

16. (Original) The transmitter of claim 15, further comprising:

a third adder adding a first dc offset to the in-phase component to compensate for dc offset introduced into the baseband signal by at least the direct upconverter; and

a fourth adder adding a second dc offset to the quadrature phase component to compensate for dc offset introduced into the baseband signal by at least the direct upconverter; and wherein

the direct upconverter receives output from the third and fourth adders.

17. (Currently Amended) A method of generating an RF signal, comprising:

up converting a first frequency signal to a second frequency signal, the second frequency signal including in-phase components and quadrature phase components; and

compensating using a plurality of filter units for at least one of gain and phase distortion introduced into the second frequency signal by at least the upconversion, the plurality of filter units including a first set of filter units configured to filter the in-phase components and quadrature phase components, output of the first set of filter units producing at least one of a

gain compensated in-phase signal and a phase compensated in-phase signal, and a second set of filter units configured to filter the in-phase components quadrature phase components, output of second set of filter units producing at least one of a gain compensated quadrature-phase signal and a phase compensated quadrature-phase signal;

deriving, based on a channel model of at least the upconverting step that includes an in-phase channel, a quadrature phase channel and cross coupling channels between the in-phase and quadrature phase channels, estimates of the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase components;

[[constructing]] configuring filter taps for [[each of the output of]] the first and second set of filter units; and

predistorting the first frequency signal.

18. (Previously Presented) The method of claim 17, further comprising:

compensating for dc offset introduced into a lower frequency signal by at least the upconversion.

19. (Original) The method of claim 18, wherein the up converting step directly up converts a baseband signal to the RF signal.

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Previously Presented) The transmitter of claim 1, wherein:

the first set of filter units include a first filter unit to filter the in-phase components and a second filter unit configured to filter the quadrature phase components; and

the second set of filter units include a third filter unit configured to filter the in-phase components and a fourth filter unit configured to filter the quadrature phase components.

24. (Previously Presented) The transmitter of claim 23, further comprising:

a first adder configured to add the output of the first and second filter units to produce the at least one of the gain compensated in-phase signal and the phase compensated in-phase signal; and

a second adder configured to add the output of the third and fourth filter units to produce the at least one of the gain compensated quadrature-phase signal and the phase compensated quadrature-phase signal.

25. (Previously Presented) The transmitter of claim 24, further comprising:

a third adder configured to add an in-phase DC component to the in-phase signal; and

a fourth adder configured to add a quadrature-phase DC component to the quadrature-phase signal, wherein the in-phase DC component and the quadrature-phase DC component compensates DC offset.

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END OF CLAIM LISTING

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